Chairman's Summary — 2nd Session, Section 4

by L.A. KOK*

Mr Selmer-Olsen was very honest in his approach. He told us that he had had some problems on his plant: the analyses of the raw materials varied, and he had very poor blending facilities. As a result of these two factors and the fact that they received their analyses only long after they had used the ore and actually poured the metal – and for that reason could do nothing with the knowledge that they got from the analyses – they have had many problems in controlling their metal analysis and, in fact, had to batch the material according to individual tap analyses. In trying to assist the plant personnel for whom this must have been a very big problem, they set out to determine the relationships between slag and metal analyses and in what way this could be applied to the system. After a tremendous amount of work, as he indicated to us, he discovered that, with the use of a computer, there was a very good basicity ratio that he could use. It so happened that this was the most complicated of the eight basicity ratios that he had investigated. He pointed out that this one dealt with the effect of manganese on manganese. Of course, this gave him a very good relationship. While he was working, he must have imagined the look of horror that would appear on the faces of the laboratory and operating personnel if they were given that as a control measure. So he decided to have a closer look at this. Then in his paper he starts to demolish this slowly – first of all looking at the α component, cutting that out, cutting other factors out, until he ends up with the simple ratio of percentage CaO over percentage SiO_2. He must have decided that he had a very much bigger chance of success in that the plant personnel would be willing to use this as the control tool.

And then he was not so very outspoken this afternoon about the work that was done by using the analyses that they got from their X-ray equipment on the raw materials to calculate what changes should be made to their mix and the improvements that they had made to their blending system to obtain good results. I would therefore like to thank Mr Selmer-Olsen for a very interesting paper. I am sure that all of us who had the idea that we should use more complicated basicity ratios are now convinced that it is quite unnecessary.

Turning to the papers delivered by Professor Howat and Mr Woollacott, I think that there is much in common between the two papers. Both have very clearly demonstrated the quality of the work done by post-graduates at the University of the Witwatersrand. It must have been very noticeable throughout the proceedings today how the researchers kept referring to work done by their colleagues. This illustrates that they have been working as a team. They are doing a tremendous amount of work that can be applied by industry. It is a pity that the industry is so slow in taking up much of the information and making use of it. The industry should give the University even more assistance in finding work with more direct application.

I feel that out of the work done so far we have had some very good results that could be applied. One of the specific ones that I can think of at this moment is that there are considerable differences in the chemical analyses of the ores that are available in South Africa compared with the analyses of ores that are used overseas. One of the significant differences is the magnesia content. As we all know, magnesia plays a very important role in the physicochemical properties of slags. We have added magnesia as a flux in the form of serpentine or dolomite. This has a marked effect on the results we achieve, and on our power consumption. We have had a lot of guidance, and it has been made very much clearer for us by the work done by Professor Howat and his team, together with the National Institute for Metallurgy and the industry, in understanding this. Through this work, we could quickly optimize even under very adverse conditions. In South Africa, we have very large deposits of the same types of ore in various parts of the country. When we use ore from the various deposits of, say, chromite, and use these in our furnaces, we find that we get different results. We have to make adjustments to the mix for our furnaces to offset some of the adverse effects.

When we run into such difficulties, we have no bank of information to refer to, as, for instance, the steel-makers have. It is especially in this respect that the industry is very much indebted to people doing this work of supplying the necessary fundamental information.

I commented briefly, after Professor Howat's presentation, on the value this work has in the schooling of metallurgists. I do not think that any one of us can underestimate the value of this work to the industry.

In conclusion, I would again like to express my sincere appreciation to Professor Howat, Mr Selmer-Olsen, and Mr Woollacott for what each of them individually and collectively has done in assisting the industry to have a better understanding of specific problems that we have in this country. We are very grateful for the fact that Professor Howat and his team try to do their work not in isolation but in very close collaboration with industry. This is one of the reasons why their work is of such high value to industry.

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